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Filed : April 22, 2004

REMARKS

Claims 1–38 are pending in this application. In the July 11, 2005 Office Action, the Examiner objects to Claim 9 as being dependent upon itself. The Examiner also rejects Claims 1–38. In particular, the Examiner rejects Claims 1–38 under obviousness-type double patenting as being unpatentable over Claims 1–31 of U.S. Patent No. 6,758,938.

The Examiner also rejects Claims 1, 2, 4–6, 9–11, 17, 18, 23–25, 27, 29, 31, 32 and 34–37 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,431,861 to Konishi et al. (“Konishi”) in view of U.S. Patent No. 5,672,212 to Manos (“Manos”) and U.S. Patent No. 6,124,158 to Dautartas et al. (“Dautartas”). The Examiner further rejects Claims 3, 16, 19 and 28 under 35 U.S.C. § 103(a) as being unpatentable over Konishi in view of Manos and Dautartas, and in further view of U.S. Patent No. 5,593,505 to Erk et al. (“Erk”). The Examiner also rejects Claims 14, 22 and 33 under 35 U.S.C. § 103(a) as being unpatentable over Konishi in view of Manos and Dautartas, and in further view of U.S. Patent No. 6,273,108 to Bergman et al. (“Bergman”).

In view of the foregoing amendment and the remarks set forth below, Applicants respectfully submit that Claims 1–38 are patentably distinguished over the cited references.

CLAIM REJECTIONS FOR OBVIOUSNESS-TYPE DOUBLE PATENTING

The Examiner rejects Claims 1–38 under the so-called non-statutory, obviousness-type double patenting rejection. In response, Applicants submit herewith a Terminal Disclaimer in compliance with 37 C.F.R. §1.321. Applicants respectfully request that the obviousness-type double patenting rejection be withdrawn.

CLAIMS 7, 8, 12, 13, 15, 20, 21, 26, 30 and 38

In view of the attached Terminal Disclaimer, Applicants respectfully submit that Claims 7, 8, 12, 13, 15, 20, 21, 26, 30 and 38, which were not rejected over the prior art, contain allowable subject matter. Applicants, therefore, respectfully request an

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indication from the Examiner that Claims 7, 8, 12, 13, 15, 20, 21, 26, 30 and 38 contain allowable subject matter.

CLAIM 9

Applicants have amended Claim 9 to depend from Claim 1 and respectfully request that the objection to Claim 9 be withdrawn.

KONISHI REFERENCE

In the July 11, 2005 Office Action, the Examiner refers to a Konishi reference as being U.S. Patent No. 5,431,861. However, U.S. Patent No. 5,431,861 is to Nagahiro et al. and does not appear to correlate with the Office Action statements by the Examiner (e.g., U.S. Patent No. 5,431,861 has no Figure 2A as described by the Examiner on Page 4 of the Office Action). Thus, for purposes of this Response, Applicants have assumed that the Konishi reference relied upon by the Examiner is U.S. Patent No. 6,145,519 (as listed in the Notice of References Cited accompanying the July 11, 2005 Office Action).

CLAIM REJECTIONS UNDER 35 U.S.C. § 103(a)

The Examiner rejects Claims 1, 2, 4–6, 9–11, 17, 18, 23–25, 27, 29, 31, 32 and 34–37 as being unpatentable over Konishi in view of Manos and Dautartas. The Examiner rejects Claims 3, 16, 19 and 28 as being unpatentable over Konishi in view of Manos, Dautartas and Erk. The Examiner also rejects Claims 14, 22 and 33 as being unpatentable over Konishi in view of Manos, Dautartas and Bergman. For the reasons set forth below, Applicants respectfully disagree.

Independent Claim 1

Focusing on independent Claim 1, in one embodiment of Applicants' invention an apparatus is disclosed comprising at least one wafer-processing chamber having an ozone-rich environment. The apparatus further includes a rotator that creates a gap between a wafer and a wafer cassette and that is configured to rotate the wafer. The apparatus also includes a pulsating fluid source configured to pulse a solution through a sprayer into the ozone-rich environment while the wafer is being rotated.

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Neither Konishi, nor Manos, nor Dautartas, nor a combination thereof, teaches or suggests the apparatus recited in Claim 1. For example, as discussed in more detail below, none of the cited references teaches or suggests a rotator that creates a gap between a wafer and a wafer cassette, wherein the rotator is configured to rotate the wafer.

Konishi

The Examiner acknowledges that Konishi fails to teach a wafer cassette corresponding to a rotator.

Manos

The Examiner cites Manos for teaching a rotational cleaner/etcher for wafers. In particular, the Examiner cites column 3, lines 59–67 for teaching a rotator that creates a gap between a wafer and a wafer carrier. Manos, however, discloses its carrier (element 1 of Figs. 1 and 2) as being the rotator (see, e.g., col. 4, lines 44–46). Furthermore, column 3, lines 45–67 of Manos describe the wafer carrier (1) having rods (11) that directly contact the wafer (1). Thus, Manos does not teach or suggest "a rotator that creates a gap between a wafer and a wafer cassette, wherein the rotator is configured to rotate the wafer," as recited in independent Claim 1.

Dautartas

Dautartas is directed to a process for forming a thin film of gate dielectric on a silicon semiconductor and does not appear to disclose a rotator as recited in independent Claim 1.

Summary

Because the cited references do not teach or suggest a rotator that rotates a wafer and that creates a gap between the wafer and a wafer cassette, Applicants assert that Claim 1 is patentably distinguished over the cited art. Applicants respectfully request that the rejection of Claim 1 under 35 U.S.C. § 103(a) be withdrawn.

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Dependent Claims 2–6 and 9

Claims 2–6 and 9 depend from independent Claim 1 and are believed to be patentably distinguished over the cited references for the reasons set forth above with respect to Claim 1 and for the additional features recited therein.

Independent Claim 10

Focusing on independent Claim 10, in an embodiment of Applicants' invention, an apparatus for processing a wafer is disclosed. The apparatus comprises: (1) a rotator configured to rotate at least one wafer within a semiconductor processing chamber and (2) a pulsating fluid source configured to pulse an ozone-rich solution into the semiconductor processing chamber while the wafer is rotating.

The Examiner cites Konishi for teaching a wafer processing chamber and a rotator for rotating the wafer within the chamber. The Examiner further cites Dautartas for teaching a pulsating fluid source. Neither of these references, however, teaches or suggests a pulsating fluid source configured to pulse an ozone-rich solution into a semiconductor processing chamber while a wafer is rotating.

Furthermore, Applicants submit that there is no suggestion or motivation to combine these references to teach the claimed invention. M.P.E.P. § 2143.01 requires that the motivation to combine references must come from: (1) the nature of problem to be solved, (2) the teachings of prior art and/or (3) the knowledge of persons of ordinary skill in art. The Examiner states that the motivation to include the pulsed valves of Dautartas with the wafer processing chamber of Konishi is that such valves "provide enhanced flow control, increased efficiency and reliability." The Examiner's stated motivation to combine Konishi and Dautartas, however, does not appear to relate to the sources for a motivation to combine as identified by M.P.E.P. § 2143.01.

In addition, Applicants submit that the nature of each of these cited references teaches away from the claimed invention, which includes a pulsating fluid source that pulses an ozone-rich solution into a semiconductor processing chamber while the wafer is rotating. Konishi appears to be directed to an apparatus that cleans a semiconductor workpiece by spraying the workpiece with a liquid and then immersing the workpiece in a liquid. Dautartas, on the other hand, discloses a hot wall reactor usable to form

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semiconductor thin film structures on a wafer through atomic layer epitaxy. Neither Konishi nor Dautartas provides a motivation to combine the references to teach a pulsating fluid source that pulses an ozone-rich solution while a wafer is rotating.

Independent Claims 17, 23 and 31

Independent Claims 17, 23 and 31 are believed to be patentable for reasons similar to those set forth above with respect to the patentability of independent Claim 10 and for the different aspects recited therein. Applicants respectfully request that the rejection of Claims 17, 23 and 31 under 35 U.S.C. § 103(a) be withdrawn.

Dependent Claims 11, 14, 16, 18, 19, 22, 24, 25, 27–29 and 32–37

Claims 11, 14 and 16 depend from independent Claim 10 and are believed to be patentably distinguished over the cited references for the reasons set forth above with respect to Claim 10 and for the additional features recited therein.

Claims 18, 19 and 22 depend from independent Claim 17 and are believed to be patentably distinguished over the cited references for the reasons set forth above with respect to Claim 17 and for the additional features recited therein.

Claims 24, 25 and 27–29 depend from independent Claim 23 and are believed to be patentably distinguished over the cited references for the reasons set forth above with respect to Claim 23 and for the additional features recited therein.

Claims 32–37 depend from independent Claim 31 and are believed to be patentably distinguished over the cited references for the reasons set forth above with respect to Claim 31 and for the additional features recited therein.

REQUEST FOR TELEPHONE INTERVIEW

Pursuant to M.P.E.P. § 713.01, in order to expedite prosecution of this application, Applicants' undersigned attorney of record hereby formally requests a telephone interview with the Examiner as soon as the Examiner has considered the effect of the arguments presented above. Applicants' attorney can be reached at (949) 721-2998 or at the general office number listed below.

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CONCLUSION

In view of the foregoing, the present application is believed to be in condition for allowance. If further issues remain to be resolved the Examiner is cordially invited to contact the undersigned such that any remaining issues may be promptly resolved.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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Dated: 10/11/05

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